

FLEAS (SIPHONAPTERA: CTENOPHTHALMIDAE AND RHOPALOPSYLLIDAE) FROM ARGENTINA AND CHILE WITH TWO NEW SPECIES FROM THE ROCK RAT, *ACONAEMYS FUSCUS*, IN CHILE

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ABSTRACT

Two new species of fleas (Rhopalopsyllidae) collected from the Rock Rat, *Aconaemys fuscus* (Waterhouse, 1842), are described from the Provinces of Nuble and Talca, Chile. They are *Ectinorus gallardoï* n.sp. and *Ectinorus mondacai* n. sp. Distribution records for other species from Chile and Argentina are also included. The current number of species of fleas known to occur in Chile is 94.

KEY WORDS: *Ectinorus gallardoï*, *Ectinorus mondacai*, Rhopalopsyllidae, flea, rock rat

INTRODUCTION

Fleas were collected by Milton H. Gallardo and Fredy Mondaca, Instituto de Ecología y Evolución, Universidad Austral de Chile, Valdivia, Chile, during phylogenetic studies of the rodent family Octodontidae in Argentina and Chile. Among these collections were two new species of *Ectinorus* Jordan, 1942 and some other flea records.

The genus *Ectinorus*, represented by 29 species, is confined to montane regions of Peru, Chile, Bolivia and Argentina, occurring primarily on octodontid rodents. Jordan (1942) erected the genera *Dysmicus* and *Ectinorus*, a systematic scheme that was followed by Macchiavello (1948) and Johnson (1957). Smit (1968) relegated the genus *Dysmicus* to a subgenus of *Ectinorus*, whereas Lewis (1976) further defined the subgeneric taxa *Dysmicus* and *Ectinorus* (exclusive of a single species assigned to the subgenus *Panallius* Jordan, 1942). Lewis (1976) also grouped the subspecies of *E. onychius* within the subgenus *Ectinorus*. Smit (1987) provides the latest comprehensive treatment of *Ectinorus*, recognizing three subgenera [*Ectinorus* (22 species), *Ichyonus* (four subspecies), and *Panallius* (one species)]. A subsequent description of two additional species [*E. (Ectinorus) curvatus* and *E. (Ectinorus) uncinatus*] provided by Beaucournu and Gallardo (1991) totals 29 species of *Ectinorus*. Two additional descriptions of species of *Ectinorus* follow.

MATERIALS AND METHODS

Measurements of tibial and tarsal segments (tarsal claws and petioles excluded) of holotypes and allotypes were recorded in microns, and the first entries for each appendage are those of the holotype followed by the allotype (reference Tables 1 and 2). The overall body dimensions of males and females were measured from the foremost portion of the frons to the apex of the st. VIII in males and to the posterior border of the sensilial plate in females. Illustrations were prepared with

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Table 1.—Measurements of tibial and tarsal segments of *E. gallardoi* n. sp.

	Segments					
	Tibia	Tarsus I	Tarsus II	Tarsus III	Tarsus IV	Tarsus V
Fore leg	96	37	37	37	35	62
	143	49	49	47	40	86
Mid leg	193	64	84	64	35	74
	217	77	116	84	42	111
Hind leg	272	153	116	77	35	89
	344	210	128	89	49	114

the aid of a camera lucida mounted on a Carl Zeiss® compound microscope. Terminology of flea structures follows that of Rothschild and Traub (1971).

SYSTEMATIC ENTOMOLOGY

Ctenophthalmidae

Neotyphloceras crassispina crassispina Rothschild, 1914

Specimens Examined.—CHILE. Valparaiso Prov.: Parque Nacional Lago Peñuelas (33°08'S, 71°31'W), ex *Octodon degus* (Molina, 1782), 14 October 1998, F. Mondaca, 1♂.

Neotyphloceras crassispina chilensis Jordan, 1936

Specimens Examined.—CHILE. Valparaiso Prov.: Parque Nacional Lago Peñuelas (33°08'S, 71°31'W), ex *Octodon lunatus* Osgood, 1943, 4 September 1999, F. Mondaca, 7♂, 7♀; ex *Abrocoma bennetti* Waterhouse, 1837, 14 October 1998, F. Mondaca, 1♂.

Neotyphloceras crassispina ssp.?

Specimens Examined.—CHILE. Valparaiso Prov.: Parque Nacional Lago Peñuelas (33°08'S, 71°31'W), ex *Thylamys elegans* (Waterhouse, 1839), 8 January 1998, F. Mondaca, 2♀.

Rhopalopsyllidae

Ectinorus (Ectinorus) gallardoi, new species

(Fig. 1A–F)

Type Material.—CHILE. Nuble Prov.: Chillán Springs (36°54'S, 71°31'W), ex: *A. fuscus*, 29 February 1998, M. H. Gallardo, 1♂ paratype. Talca Prov.: Reserva Nacional Radal 7 Tazas, (35°28'S, 70°59'W), ex: Rock Rat, *Aconaemys fuscus* (Waterhouse, 1842), 24 March 1999, Fredy Mondaca, holotype, allotype and 2♂, 1♀ paratypes. Reserva Nacional Altos de Lircay (35°36'S, 71°12'W), ex:

Table 2.—Measurements of tibial and tarsal segments of *E. mondacai* n. sp.

	Segments					
	Tibia	Tarsus I	Tarsus II	Tarsus III	Tarsus IV	Tarsus V
Fore leg	165	49	52	44	40	99
	153	57	64	49	42	111
Mid leg	254	96	111	96	42	109
	262	104	121	67	44	114
Hind leg	363	222	151	91	52	116
	387	242	161	94	47	121

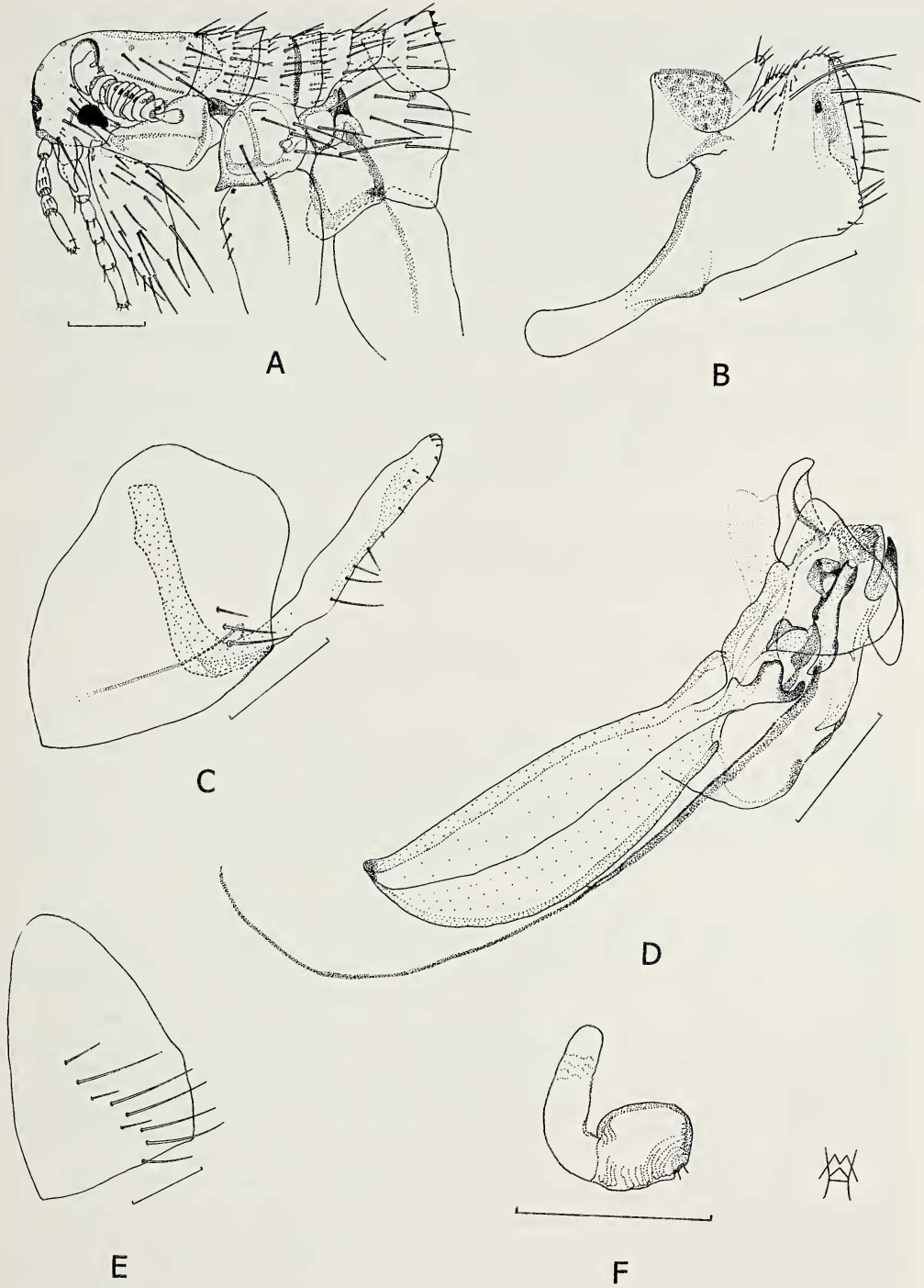


Fig. 1.—*Ectinorus gallardoi* n. sp. A. Head and thorax, male holotype. B. Male clasper (basimere and telomere). C. Eighth and ninth sternites, male. D. Aedeagus. E. Female seventh sternum. F. Spermatheca. Scale=100 μ .

A. fuscus, 28 February 1998, M. H. Gallardo, 17♂, 8♀ paratypes. Holotype (USNM 105736), allotype and four paratypes (2♂, 2♀) deposited in the National Museum of Natural History, Washington, D. C.; six paratypes (3♂, 3♀) in the Carnegie Museum of Natural History, Pittsburgh, PA (Accession No. 36,734); seven paratypes (4♂, 3♀) in the Museo Nacional Historia Natural (Zoology Section), Santiago, Chile; remaining paratypes (11♂, 1♀) in the collection of the author.

Diagnosis.—Males and females of this new species key to the couplet of *E. cocyti* and *E. chilensis* according to Smit (1987). Males may be separated from those of *E. cocyti* by the absence of a conspicuous dorsal spur arising from the dorsal extension of the lamina of the aedeagus near the base of the median dorsal lobe and from both *E. cocyti* and *E. chilensis* by the presence of an apically pointed median dorsal lobe, an apically pointed crochet, the lobe on the dorsal caudal margin of st. VIII is more pronounced, and other details of the aedeagus. Females are not separable from *E. cocyti* and *E. chilensis*, although host associations may be a distinguishing factor. *Ectinorus gallardoii* appears to prefer the single host *A. fuscus* (note collection records from three distinct localities), whereas *E. cocyti* and *E. chilensis* have never been reported from this host. This new species is also separable from the newly described species below (*E. mondacai*) by the absence of overlapping lobes on the posterior margin of the st. VIII.

Description.—Head (Fig. 1A): Frons somewhat bluntly rounded in male, less so in female. Stout upturned tubercle dorsad to oral angle. Ocular row of 4 setae with intercalaries. Occipital area with three rows of a single seta each and main row with 5 setae on one side and 6 on other with additional intercalaries. Pigmented eye well developed with ventral sinus, 1–2 minute setae behind eye on genal lobe and a single stout seta just below eye (not marginal). Caudal margin of genal lobe slightly concave. Setae of scape and pedicel at most reaching the next segment. Clavus extending onto propleurum in both sexes, especially the male. Shallow occipital sulcus present in male. Labial palpus of five segments extending to trochanter. Thorax (Fig. 1A): Pronotum with two rows of setae (anterior row: 3 per side male, 6 per side female; main row: 7 per side). Propleuron with dorsal depression to accommodate apex of antenna. Mesonotum with two rows of setae in male (anterior row: 5–6 per side; main row: 5 per side) and three in female (anterior row: 2–3 minute setae per side; middle and main row: each 6 per side). Flange of mesonotum with 8–9 pseudosetae per side in male and 10–11 per side in female. Mesepisternum 1 seta, mesepimeron 4 setae. Mesosternum reduced to a sclerotized point. Metanotum with two rows of setae in male (anterior row: 5; main row: 5) and three rows in female (anterior row: 2–3 minute setae per side; middle row: 8 per side; main row: 5 per side). Lateral metanotal area with 2 setae, pleural arch well developed. Metepisternum with 1 seta, metasternum anteriorly rounded and not protruding downward. Metepimeron with two vertical rows of setae variable from 2–5 in each row, but usually 3 in each row. Legs (Table 1): Procoxa has 20–21 lateral setae, none of which is marginal. Anterior margins of meso- and metacoxae with setae from base to apex on lateral surfaces. Fore femur with lateral group of 4–5 setae and single mesal seta, mid and hind femora each with ventral row of 5–6 lateral setae and 2–3 on mesal surface. The lateral femoral-tibial bristle longer of two on fore femur and shorter on mid and hind femora. Dorsal margin of fore, mid and hind tibiae with 6, 7, and 7 notches, respectively. A row of 7–8 setae adorns the lateral surface of mid and hind tibiae. Four lateral plantar bristles on all tarsal segments, the apical pair distinctly separated from the proximal three pairs, which are evenly spaced. Unmodified Abdominal Segments: Males with two rows of setae on t. I (anterior row: 5 per side; main row: 6 per side) and a single row on t. II–VII (8 per side), one below level of rounded spiracles. Females have two rows per side on all segments of t. I–VII (anterior row: 5, 7, 6, 7, 5, 5, 5 per side, respectively; and main row: 6, 8, 8, 8, 8, 8, 5 per side, respectively). Marginal spinelets on t. I vary from 3–4 per side. Two setae are below level of spiracle on t. III–VI of female. Single antesensillial bristle recessed in notch in female and marginal in male. Males have single row of setae on st. II–VII (1, 3, 3, 3, 3, 3 per side, respectively) and females have single minute seta per side on st. II, two rows on st. III–V (anterior row: each 1 per side; and main row: each 4 per side), and single row of 5 per side on st. VI. Modified Abdominal Segments, male (Fig. 1B–C): Tergum VIII inconspicuous. Basimere of t. IX entire along apicoventral margin. Telomere small, pointed apically, with ventral portion extended far below level of articulation. Acetabular bristle small. Manubrium spatulate and broadest apically. Margin of st. VIII entire with broadly rounded dorsocaudal lobe, lateral row of 3–4 small setae. Sternum IX rod-like with row of fine evenly dispersed setae along ventral margin. Tendon of st. IX absent. Aedeagus (Fig. 1D): Crochet notably sclerotized, pointed apically, bearing ventral membranous lobe. Sclerotized inner tube thick

walled, adorned with heavy thorn-like process on the dorsal margin. Paired median dorsal lobe delicately membranous with bifid, heavily sclerotized apical sclerites, both enveloped within faintly visible membranous lateral lobes. The apical sclerites of median dorsal lobe are "hinged" basally to a sclerotized extension of the median lamina, which forms the dorsal portion of the end chamber. Though not coiled, the penis rods extend far beyond the apex of the aedeagal apodeme. Modified Abdominal Segments, female (Fig. 1E–F): Tergum VIII bearing row of 3–4 small setae anterior to a vermiform spiracle. Laterally t. VIII has two rows of setae (7–8 small and 2–3 stout setae per side), 8–9 marginals, and a group of 8–10 setae on a lobe beneath the apex of the sclerite. The anal stylet arises from the ventrolateral margin of the dorsal anal lobe and bears a single apical bristle. Sternum VII is without sinuses or lobes, although the caudal margin is slightly undulate and is adorned with a main row of 7 setae and 2–3 small setae anterior to these. Bursa copulatrix is thin, sclerotized and apically reflected caudad. The bulga of the spermatheca is slightly longer than wide, the hilla exceeding the length of the bulga.

Dimensions (slide mounted specimens).—Male, 1.7 mm (n=21), female, 2.2 mm (n=10).

Etymology.—Dr. Milton H. Gallardo, Instituto de Ecología y Evolution, Universidad Austral de Chile, Valdivia, Chile, has contributed significantly to an understanding of the phylogeny of octodontid rodents in the Southern Cone of South America. During these studies, he devoted considerable time to collecting ectoparasites. This new species is thus named in his honor.

Remarks.—All specimens were collected from *A. fuscus* at several sites separated by several hundred kilometers. Since it occurs in the central range of *A. fuscus*, it may have a wider distribution to the north and to the south of current records.

Ectinorus (Ectinorus) mondacai, new species
(Fig. 2A–N)

Type Material.—CHILE. **Nuble Prov.:** Chillán Springs (36°54'S, 71°31'W), ex: *A. fuscus*, 29 February 1998, M. H. Gallardo, allotype and 2♂, 6♀ paratypes. **Talca Prov.:** Radal 7 Tazas Nacional Parque (35°28'S, 70°59'W), ex *A. fuscus*, 24 February 1999, Fredy Mondaca, holotype and 2♂, 2♀ paratypes. Holotype (USNM 105735), allotype, and two paratypes (1♂, 1♀) deposited in the National Museum of Natural History, Washington, D. C.; four paratypes (1♂, 3♀) in the Museo Nacional Historia Natural (Zoology Section), Santiago, Chile, remaining paratypes (2♂, 4♀) in the collection of the author.

Diagnosis.—Most closely related to *E. martini* to which both males and females key according to Smit (1987). Males may be distinguished from *E. martini* by the shape of the st. IX which is mitten shaped, presence of a deep cleft in the lateral lobe of aedeagus, median dorsal lobe extremely sclerotized, sclerotized inner tube with dorsal and ventral lobes, and ventral aedeagal pouch ending about half the distance of the length of the median lamina; whereas in *E. martini*, the st. IX is not mitten shaped, the cleft in the lateral lobe is shallow, median dorsal lobe less sclerotized, sclerotized inner tube is without lobes, and ventral pouch of aedeagus extends to near apex of median lamina. Females of *E. martini* and *E. mondacai* are indistinguishable.

Description.—Head (Fig 2A): Frons evenly rounded with 2 marginal placoid pits evenly spaced between a well-developed frontal tubercle and the antennal fossa. Preantennal area with an uneven ocular row of 2 medium and 2 larger setae with several scattered small setae at level of eye in male and 3 setae in ocular row of female. Eye medium size with ventral sinus, darkly pigmented and confluent with heavily sclerotized margins of tentorium. Anterior arm of tentorium clearly visible anterior to eye. Single heavy seta at posteroventral margin of eye and 2 minute setae on apical lobe that is subtended by shallow sinus. Shallow occipital groove extends from falx to posterior margin of head in male. Occipital region with three placoid pits, four rows of setae (single seta in each of three anterior rows and 4–5 with intercalaries in posterior row) in male and two rows in female (single seta

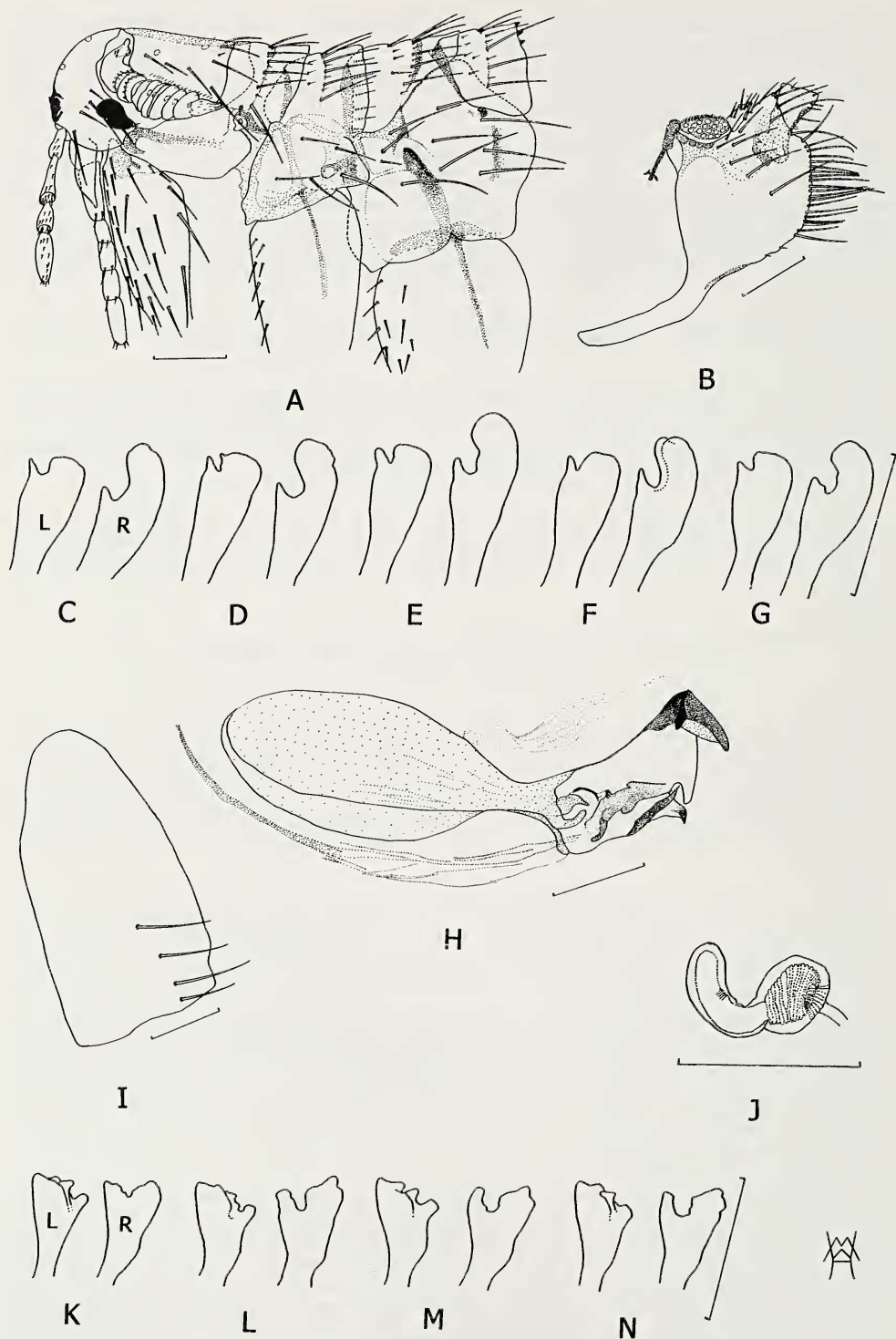


Fig. 2.—*Ectinorus mondacai* n. sp. A. Head and thorax, male holotype. B. Male clasper. C–G. Lateral apical aspect of the distal arm of male ninth sternum (paired) of five specimens (L=left, R=right per pair). H. Aedeagus. I. Female seventh sternum. J. Spermatheca. K–N. *Ectinorus levipes*, lateral apical aspect of the distal arm of male ninth sternum (paired) of four specimens (L=left, R=right per pair). Scale=100 μ .

in anterior row and 5–6 with intercalaries in posterior row). Antennal groove with dense row of minute setae along dorsal margin (only two minute setae in female). Antenna extending onto prosternum. Antennal scape of male with minute setae at base and fringe of short setae along apical flange; flange of pedicel with several minute setae along dorsal margin and a single seta at ventral margin. Pedicel of female with interior lobe bearing 1 small seta and a single stout seta that extends half the length of the clavus. Epipharynx, maxillary lacinia and 5 segmented labial palp extending to apex of fore coxa. Maxilla acutely pointed; anterior margin convex. Four segmented maxillary palp extending ca. two-thirds the length of fore coxa. Thorax (Fig. 2A): Pronotum higher than long, bearing single row of 6–7 setae per side with intercalaries. Prosteronotum broadening posterad. Mesonotum with anterior row of 3 setae and posterior row of 5 larger setae per side with intercalaries. Mesonotal collar with 9–10 pseudosetae per side whose lengths extend well beyond margin of collar. Mesepimeron bearing 3 setae; mesepisternum with single seta. Metanotum with 3 rows of setae in male; per side, single small dorsal in anterior row, 3–4 in middle row and 7 in posterior row with intercalaries. Ventral seta in main row distinctly separated from those dorsad. Female with two rows, each with 5 setae per side. Lateral metanotal area with 2 setae, 1 long and 1 short. Pleural arch well developed with very robust pleural ridge. Metepisternum with single seta. Metepimeron with distinct broad lobe along caudal margin; two rows of setae, anterior row with 3 setae (upper seta dorsad to spiracle), posterior with 3 (upper seta ventrad to spiracle). Female has 2 setae in anterior row and 3 on posterior, all ventrad to spiracle. Legs (Table 2): Procoxa with 28–30 lateral setae (including marginals). Fore femur with 11–13 lateral setae, 2 mesal setae, 2 large posteroventral marginal setae, fringe of minute setae along dorsal margin and 2 large bristles guarding femoral-tibial joint (mesal bristle smaller of two). Tibia with 5 dorsal notches (2, 2, 3, 2 and 3 bristles, proximal to distal) and a vertical lateral row of 4 small setae. Outer internal ridge of mesocoxa only developed dorsally. Suture dividing outer surface of mesocoxa at most indicated. Mid femur with 8–9 lateral setae, mesal row of 5 setae (3 in female), marginal row along dorsum, single seta at postero-ventral margin, and 2 large bristles guarding femoral-tibial joint (mesal larger of two). Tibia bearing 6 dorsal notches (2, 2, 2, 3, 2, 3 bristles, proximal to distal) and lateral row of 5 setae. Metacoxa with well-developed and complete outer internal ridge; patch of slender setae extending along anterior lateral margin increasing in number from base to apex. Hind femur with two lateral rows of setae (7 ventrad, 1 dorsad) (one lateral row in female of 6 setae), ventral mesal row of 9 setae (7 in female), dorsal margin with fringe of setae, and a single postero-ventral seta. Arrangement of two large bristles guarding femoral-tibial joint is the same as for that of mid femur. Sculpturing of lateral cuticular surface densely striated and mesal surface coarsely sculptured perpendicular to long axis of appendage. Tibia with 6 dorsal notches (2, 2, 2, 3, 2, 3 bristles, proximal to distal), two lateral rows of setae (ventral row of 9 and row of 9 adjacent to dorsal notches), and prominent apical tooth. Mesal surface bears minute tubercles along coarse reticulations. Distotarsomeres of all segments bear 4 pairs lateral plantar bristles, 2 pre-apical plantar bristles (semispiniform—1 long, 1 short), and pair of pre-apical plantar hairs. Unmodified Abdominal Segments: Abdominal segments (tergites and sternites) appear banded because of dark sclerotizations cephalad and lighter cuticle caudad. Two rows of setae per tergite, all main rows bearing intercalary setae. Considerable variation exists in number of setae from specimen to specimen among males and females. Setae per side in main row on t. I–VII; 5–6, 8–10, 8–9, 7–9, 7–8, 6–7, in males and 4–7, 8–10, 8–10, 7–9, 7–8, 6–8, 4–6, in females, respectively. Marginal spinelets per side on t. I: 2–4 in males, 0–4 in females. Single antesensilial bristle borne on a peduncle recessed in a V-shaped notch. Setae per side in main row on st. II–VII; 2–3, 3, 3, 3, 3, 3, in males and 2–3, 4, 3, 3, 3, 4, in females. Sternite II of males and females with lateral patch of 5–6 and 13–14 small setae on anterodorsal surface, respectively. Modified Abdominal Segments, male (Figs. 2B, 2C–G): Tergite IX similar to that of *E. martini*. Basimere with narrow, strongly upturned manubrium, body apically extended into a bluntly acute lobe subtended by a shallow sinus and broad ventral lobe. Ventral lobe fringed with long evenly spaced setae. Telomere slightly concave along ventral margin, apex bluntly square and extending beyond apical lobe of basimere. Sternum VIII distinctly more heavily sclerotized than preceding segments; apex obliquely blunt with extreme sclerotization, 2–3 lateral setae subtended by 5–6 smaller setae. Distal arm of st. IX resembling a mitten with thumb extended; bearing a fringe of setae along ventral margin. The apical mitten-like clubs of the paired distal arms of st. IX are asymmetrical on all five specimens; the apex of the thumb of the mitten on the left side extends to the apex of the mitten's fingers, whereas the apex of the fingers are extended far beyond the thumb on the right side. Aedeagus (Fig. 2H): Dorsal median lobe heavily sclerotized, lobe nearly right angled anterodorsally, terminating in a rounded point. Lateral lobes bifurcate into two lobes, dorsal lobe acute at apex and ventral lobe truncate. Ventral floor of end pouch terminates midway along medial lamina as a sharp projection. Modified Abdominal Segments, female allotype (Figs. 2I–J): Tergum VIII with group of 3–4 small setae dorsal to vermiform spiracle, subtended by vertical row of 5 setae; caudal margin convex, slightly undulating with marginal row of 6 setae. Mesal lobe adorned with 17–18

setae (8 long, 9–10 short). Sensillum with narrow sensillial plate. Anal stylet 2.5 times as long as greatest width, positioned medioventrad on dorsal anal lobe, bearing 2 apical setae (1 long, 1 minute). Ventral anal lobe flattened on dorsal margin; angled ventrally. Caudal margin of st. VII entire with shallow sinus ventrocaudally; bearing row of 4 lateral setae per side. Sternum VIII terminating in a broad, blunt lobe bearing 4–5 minute setae whose alveoli are more conspicuous than setae; lateral surface markedly reticulated. Bulga of spermatheca slightly oval with walls thickened. Terminal half of hilla sclerotized and wider than hyaline proximal portion. Bursa copulatrix with several polymorphic sclerites, dorsum of perula sclerotized. Venter of oviduct sclerotized just anterior to bursa copulatrix. Duct of spermatheca on right side, blind duct on left.

Dimensions (slide mounted specimens).—Male, 2.0 mm (n=5), female, 2.5 mm (n=9).

Etymology.—The species is named *E. mondacai* in behalf of Fredy Mondaca, Instituto de Ecología y Evolution, Universidad Austral de Chile, Valdivia, Chile, whose collection efforts and fieldwork made the discovery of this new species possible.

Remarks.—Sympatric with known specimens of *E. gallardoi* and found solely on *A. fuscus*, *E. mondacai* may also be more widely distributed than our records indicate. The shape of the apex of st. IX of all males examined was markedly asymmetrical. Asymmetry of paired genital structures in the Order Siphonaptera was first illustrated by Smit (1987) in a specimens of *E. levipes* (Jordan and Rothschild, 1923), although no comment was provided. It is noteworthy that it occurs in *E. mondacai* and also in *E. levipes*, both in the subgenus *Ectinorus*. The asymmetry is illustrated in five males of *E. mondacai* (Fig. 2C–G) and four males of *E. levipes* (Fig. 2K–N). The evolution or function of this asymmetry can not be explained, since the correlating copulatory structures of the female (st. VII and VIII) are symmetrical. Such odd and consistent genetic expression of asymmetry occurring in like structures (st. IX) among males of two distinct, but closely related taxa, would support their evolutionary affinity.

Ectinorus chilensis Lewis, 1976

Specimens Examined.—CHILE. Valparaiso Prov.: Parque Nacional Lago Peñuelas (33°08'S, 71°31'W), ex *A. bennetti*, 14 October 1998, F. Mondaca, 1♂; ex *O. degus*, 30 December 1997, F. Mondaca, 1♂.

Ectinorus levipes (Jordan and Rothschild, 1923)

Specimens Examined.—ARGENTINA. Neuquén (1177 m): ex *Akodon olivaceus* (Waterhouse, 1837), 7 September 1991, D. Gettinger 4♂; ex *Akodon* sp., 8 September 1991, Minzenmayer 1♀. Other material belonging to the same series in the R. E. Lewis collection that were not examined by the author include the following: Neuquén, (1177 m): ex *Phyllotis* sp., 7 September 1991, D. Gettinger, 1♂; ex *A. olivaceus*, 7 September 1991, Minzenmayer, 1♂, and Neuquén, (793 m): ex *A. olivaceus*, 25 September 1991, D. Gettinger, 1♂.

Remarks.—Robert E. Lewis has eight specimens of *E. levipes* (7♂, 1♀) from Argentina in his collection, heretofore unreported in the literature. Although this species was not found in our study, its apparent asymmetry, paralleling that of *E. mondacai*, was of interest (see Remarks under *E. mondacai* above). Dr. Lewis kindly provided five specimens (4♂, 1♀) for evaluation of asymmetry and granted permission to document records of all eight specimens.

Delostichus coxalis (Rothschild, 1909)

Specimens Examined.—CHILE. Valparaiso Prov.: Parque Nacional Lago Peñuelas (33°08'S, 71°31'W), ex *O. lunatus*, 14 October 1998, F. Mondaca, 1♀; ex *O. degus*, 14 October 1998, F. Mondaca, 2♀; ex *A. bennetti*, 23 December 1997, F. Mondaca, 1♀.

Delostichus incisus Beaucournu and Torres-Mura, 1987

Specimens Examined.—**ARGENTINA. San Juan Prov.:** Parque Nacional Ischigualasto, ex *Octomys mimax* Thomas, 1920, 8 April 1997, M. H. Gallardo, 4♂, 3♀.

Tetrapsyllus corfidii (Rothschild, 1904)

Specimens Examined.—**CHILE. Talca Prov.:** Reserva Nacional Altos de Lircay, ex *A. fuscus*, 28 February 1998, M. H. Gallardo, 4♀, 2♂. **Valparaiso Prov.:** Parque Nacional Lago Peñuelas, ex *O. degus*, 14 October 1998, F. Mondaca 1♂, 1♀; ex *A. bennetti*, 14 October 1998, F. Mondaca, 2♀; ex *A. bennetti*, 23 December 1997, F. Mondaca, 1♂, 1♀; ex *O. lunatus*, 14 October 1998, F. Mondaca, 1♂, 3♀.

DISCUSSION

The distribution of the three subspecies of *N. crassispina* (*N. c. hemisus* Jordan, 1936, *N. c. chilensis*, and *N. c. crassispina*) extends from northern Peru to central Bolivia and south through Chile and western Argentina (Smit, 1968). Sympatry of *N. c. chilensis* and *N. c. crassispina* in Valparaiso Province promotes hybridization, making identifications at the sub-specific level uncertain. Based on the length, shape, and setation of the apical portion of the fixed process of the clasper [originally proposed as diagnostic criteria by Jordan (1936)], only a single male was clearly *N. c. crassispina*. The remaining specimens were *N. c. chilensis*. The sole male *N. c. crassispina* has a delicate dorsal membranous lobe arising from the dorsal portion of the aedeagus, which is enveloped by the two lobes of the fixed process of the clasper. This membranous lobe is covered with translucent spicules. This structure is also present in all specimens of *N. c. crassispina* recently collected by the author in Ancash Department, Peru (elevation 7,200m), but is absent in *N. c. chilensis* examined from Valparaiso Province. The modified segments of *Neotyphloceras* spp. are among the most complex in the Order, yet they have never been studied in detail sufficient to determine the validity of these sub-specific taxa. Sub-specific identification of females as *N. c. chilensis* was based on accompanying males. In the absence of accompanying males, the two females from the marsupial, *T. elegans*, could not be determined with certainty. Host specificity is of no value in differentiating *Neotyphloceras* spp., as each is catholic in their host preference of cricetid and octodontid rodents and occasionally marsupials.

Reports of *Delostichus coxalis* and *T. corfidii* have been restricted to octodontid rodents in the coastal montane environs of Valparaiso Province. Such limited distribution of these rather common species reflects a lack of collection effort, as their host species are much more widely distributed.

Delostichus incisus has not been reported since its original description by Beaucournu and Torres-Mura (1987) from two specimens of *O. mimax* (29♂, 49♀). *Octomys mimax* is restricted to the western Andean foothills and montane slopes of western Argentina. Although additional collecting of fleas from *O. mimax* in areas outside the type locality (Parque Nacional Ischigualasto) will undoubtedly extend its range in Argentina, it is likely not present in Chile.

Beaucournu and Gallardo (1991, 1992) summarized 91 species of fleas in Chile, whereas one additional species (*Ceratophyllus altus*) was reported by Hastriter (2001). In summary, the description of two new species document 31 species in the genus *Ectinorus* and a total of 94 species reported in Chile.

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